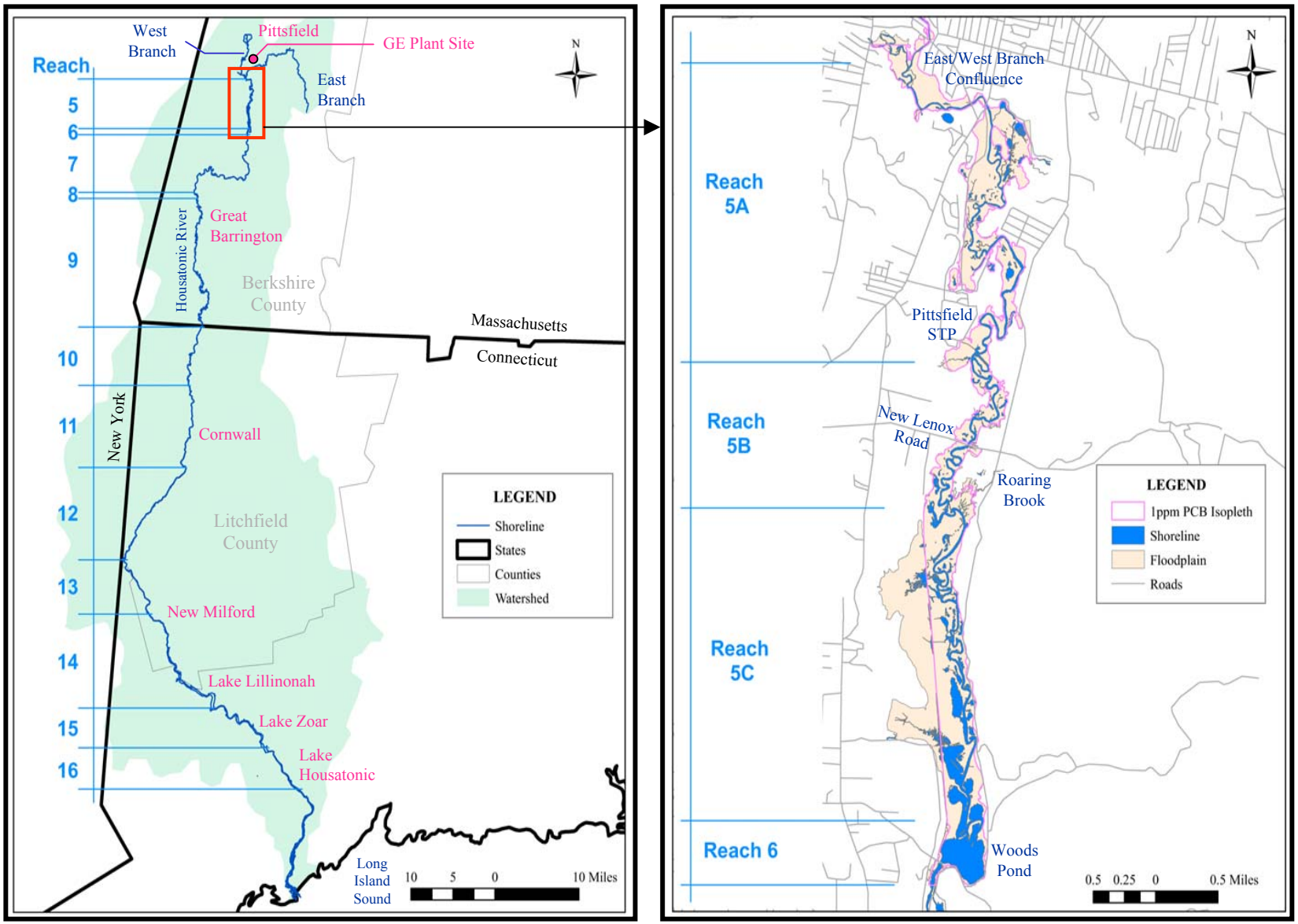
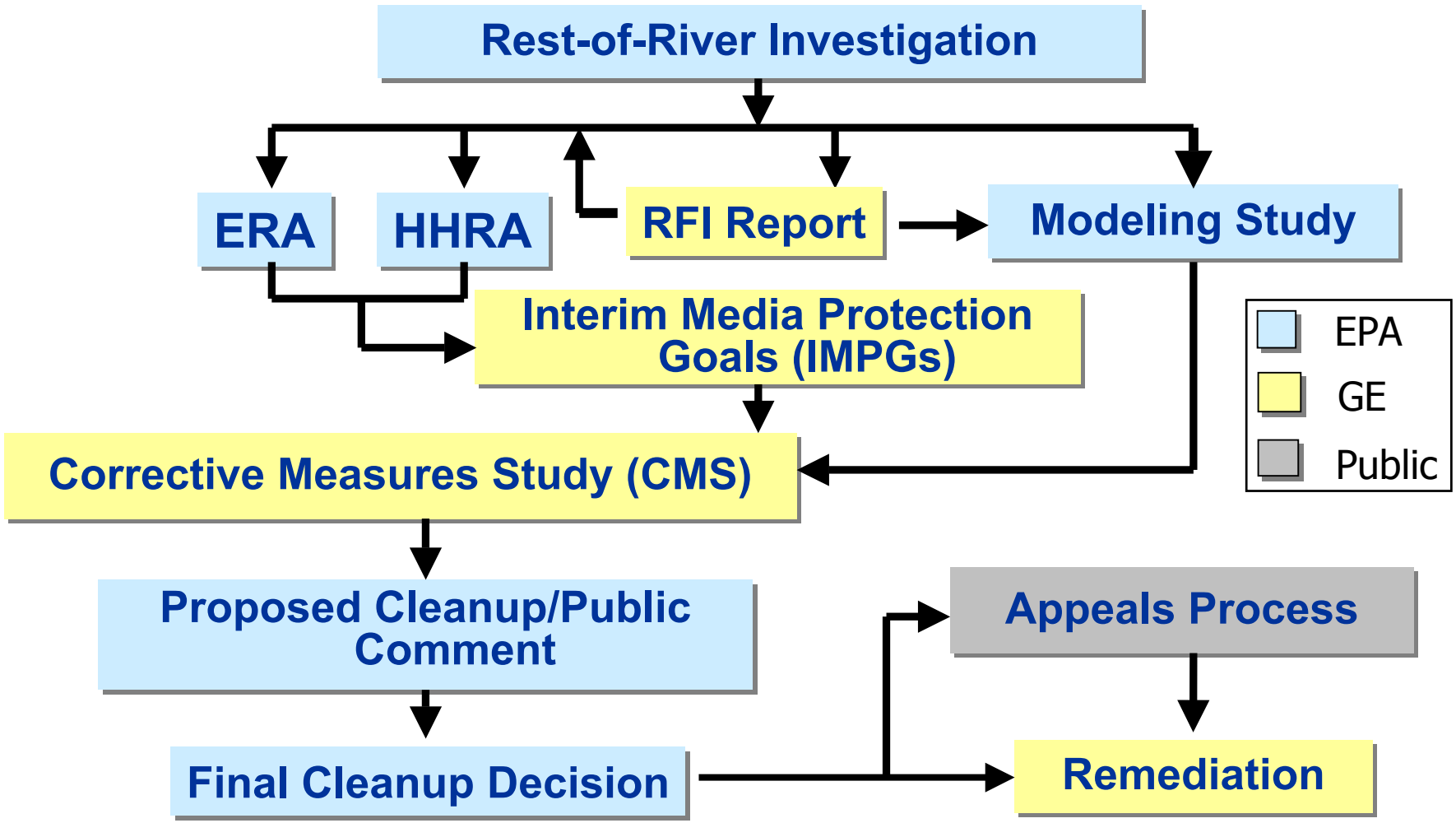
INTERIM MEDIA PROTECTION GOALS (IMPGs) PROPOSAL

October 26, 2005


West Branch
Pittsfield
GE Plant Site
East Branch
Reach
5
6
7
8
9
10
11
12
13
14
15
16
Housatonic River
Great Barrington
Berkshire County
Massachusetts
Connecticut
New York
Cornwall
Litchfield County
New Milford
Lake Lillinonah
Lake Zoar
Lake Housatonic
Long Island Sound
10 5 0 10 Miles
N
LEGEND
Shoreline
States
Counties
Watershed
East/West Branch Confluence
Reach 5A
Pittsfield STP
Reach 5B
New Lenox Road
Roaring Brook
Reach 5C
Reach 6
Woods Pond
0.5 0.25 0 0.5 Miles
LEGEND
1ppm PCB Isopleth
Shoreline
Floodplain
Roads

REST OF RIVER REMEDIAL PROCESS



IMPGs – WHAT ARE THEY?

Interim Media Protection Goals (IMPGs)

- The Rest of River remedial process is described in a RCRA Corrective Action Permit issued by EPA to GE as part of the overall agreement embodied in Consent Decree. The IMPG Proposal is one step in that process.
- The Permit requirements for IMPGs include:
  - Shall consist of preliminary goals to serve as points of departure in evaluating potential remedies in CMS; not cleanup standards to be met in Rest of River and do not dictate any particular remedy.
  - Must address constituents that have migrated from GE facility to Rest of River and were identified in EPA risk assessments as contributing to risk.
  - Must include numerical concentration goals for human health protection; may also include narrative descriptive goals.
  - May include either numerical or narrative goals for ecological receptors.
  - Must take into account EPA's Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA).
  - Must also take into account chemical-specific values from generally applicable federal and state laws and regulations, known as ARARs (for "applicable or relevant and appropriate requirements").

GE'S IMPG PROPOSAL:

OVERVIEW

MEDIA, PATHWAYS, AND CONSTITUENTS

- Media and Pathways: IMPG Proposal includes numerical IMPGs for:
  - Floodplain soil and sediment based on direct human contact;
  - Fish and waterfowl tissue based on human consumption;
  - Agricultural products (cow milk and beef, poultry meat and eggs, produce) based on human consumption; and
  - Various media for protection of ecological receptors:
    - Benthic invertebrates;
    - Frogs;
    - Shrews;
    - Fish;
    - Mink and otter;
    - Osprey;
    - Bald eagles; and
    - Wood ducks.
- Constituents Covered by IMPG Proposal:
  - PCBs for all above media and pathways.
  - Dioxin Toxicity Equivalents (TEQs) for fish and waterfowl based on human consumption and for a couple of ecological receptors (fish based on risks to fish, wood ducks).

OVERVIEW OF APPROACH

- Use of Ranges: IMPG Proposal sets forth a range of values for each human exposure scenario and ecological receptor.
  - For human health, ranges include 8 values for each scenario/receptor. Based on:
    - Two types of exposure – Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE) (average).
    - For each, 3 cancer risk levels within EPA's cancer risk range, plus non-cancer.
  - For ecological receptors, ranges generally include Maximum Acceptable Threshold Concentration (MATC) identified by EPA and other effect thresholds from studies in ERA.
- Assumptions and Inputs Used: Proposal contains two sets of IMPG ranges:
  - One set based directly on exposure assumptions, toxicity values, and data interpretations used in HHRA and ERA, even though GE does not agree with many of them.
  - Second set based on many of these same inputs combined with several alternative exposure assumptions, toxicity values, and data interpretations that GE believes are more scientifically supportable.
  - Both sets are conservative – e.g., health-based values are based on hypothetical exposure assumptions and on toxicity values derived from animal studies, not actual human health effects.
- Narrative Descriptive Goals: For both human and ecological receptors, narrative descriptive goals have also been proposed for consideration in the CMS.

IMPGs FOR HUMAN HEALTH PROTECTION

DIRECT CONTACT WITH FLOODPLAIN SOIL AND SEDIMENT

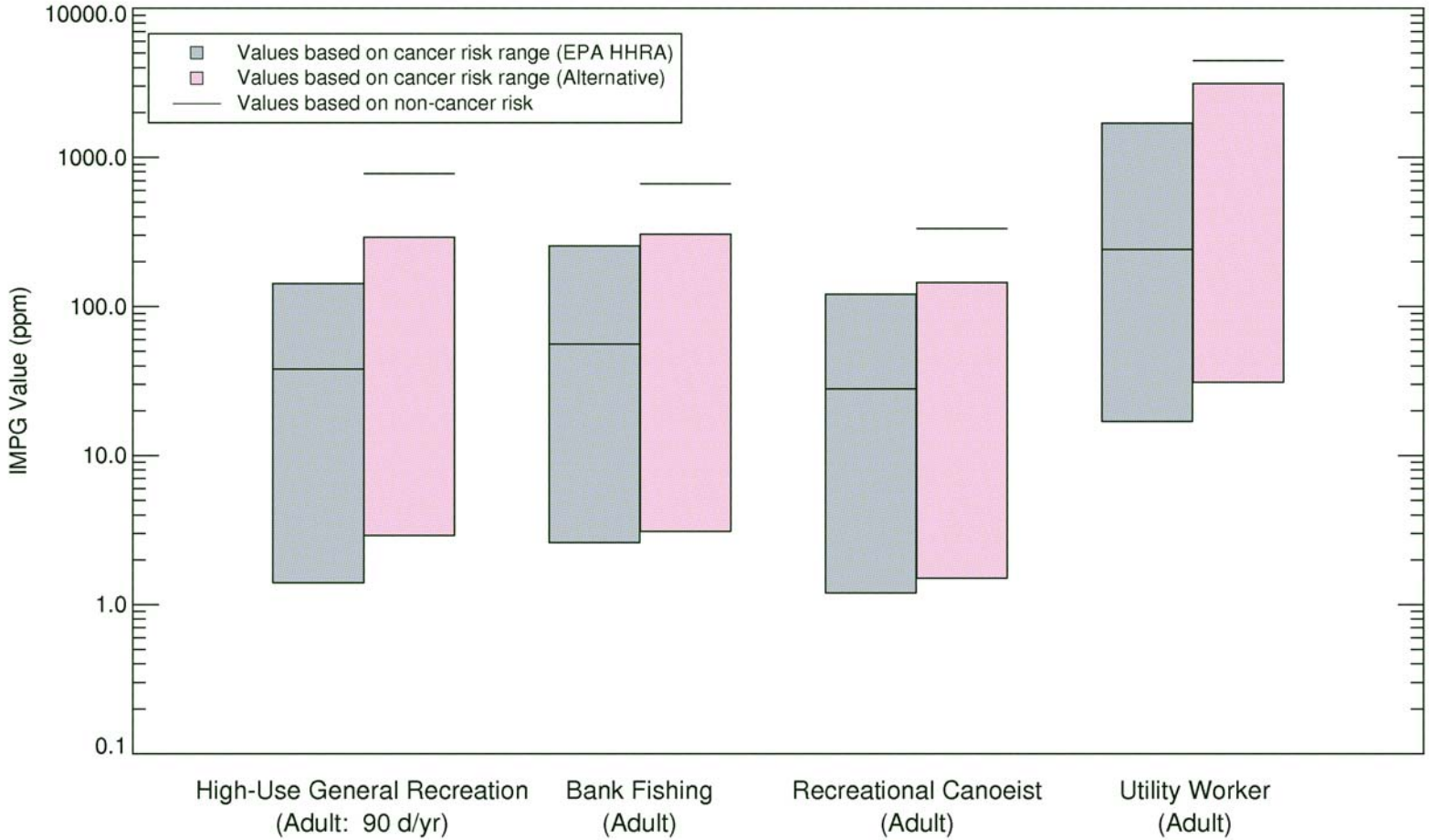
BACKGROUND

- Direct contact involves combination of incidental ingestion of soil/sediment and dermal contact with soil/sediment.

- HHRA evaluated numerous direct contact scenarios. Ranges of IMPG values for PCBs in soil/sediment have been proposed for each:
  - General recreation (high-use, medium-use, and low-use);
  - Specific recreational activities (bank fishing, dirt biking/ATVing, marathon and recreational canoeing, waterfowl hunting);
  - Agricultural use based on direct contact by farmer;
  - Commercial groundskeeper (high-use and low-use);
  - Utility worker (for utility corridors);
  - Sediment contact.

- For residential lawns or potential future lawn areas, GE and EPA agreed in Consent Decree on PCB Performance Standard – 2 ppm.

SOIL IMPG EXAMPLES FOR SELECT DIRECT CONTACT SCENARIOS *



- Ranges shown are for RME.
- Cancer-based values range from PCB concentration based on 10^{-6} cancer risk (1 in a million) to PCB concentration based on 10^{-4} cancer risk (1 in 10,000).

FISH AND WATERFOWL CONSUMPTION

BACKGROUND

- HHRA evaluated risks due to human consumption of fish and waterfowl from Housatonic.
  - Separate evaluations for: (1) bass in MA and CT; (2) trout in CT; and (3) waterfowl.
  - Risks evaluated in 2 ways – through deterministic analysis (using point estimates of assumptions) and probabilistic analysis (using distributions of exposure assumptions).

IMPG RANGES

- IMPG Proposal includes ranges of PCB and dioxin TEQ values for fish tissue (fillets) and duck breast tissue based on human consumption.
- Examples of ranges for PCBs in fish fillets, based on assumptions in HHRA:
  - For bass (deterministic): ~ 0.002 to 0.2 ppm for RME; ~ 0.05 to 5 ppm for CTE.
  - For CT trout (deterministic): ~ 0.005 to 0.5 ppm for RME; ~ 0.1 to 11 ppm for CTE.
- Examples of ranges for PCBs in fish fillets, based on alternative assumptions:
  - For flowing reaches (deterministic): ~ 0.005 to 1 ppm for RME; ~ 0.18 to 18 ppm for CTE.
  - For flowing reaches (probabilistic): ~ 0.02 to 2 ppm for RME; ~ 0.5 to 55 ppm for CTE.

AGRICULTURAL PRODUCTS CONSUMPTION

BACKGROUND

- HHRA evaluated risks due to human consumption of agricultural products from Housatonic floodplain.
  - Milk consumption from commercial and backyard dairy farms
  - Beef consumption from commercial and backyard beef cow farms
  - Consumption of poultry meat and eggs from commercial and backyard poultry farms
  - Consumption of homegrown produce from commercial and backyard produce farms

IMPG RANGES

- IMPG Proposal includes ranges of values for PCBs in farm animal or produce tissue (not in soil), based on human consumption of those products.
- Examples of ranges for PCBs in farm animal tissue based on EPA assumptions:
  - For poultry meat at commercial poultry farm: ~0.0002 to 0.02 ppm for RME; ~0.001 to 0.14 ppm for CTE.
  - For beef tissue at commercial beef farm: ~ 0.0002 to 0.02 ppm for RME; ~ 0.0008 to 0.08 ppm for CTE.
- Ranges based on alternative assumptions are similar.

NARRATIVE DESCRIPTIVE GOALS FOR HUMAN HEALTH PROTECTION

- Example for direct contact with soil/sediment:

  "To reduce the average PCB concentrations in floodplain soils and sediments in the Rest of River as necessary so that they do not present significant risks of harm to the health of individuals who contact such soil and sediment directly, taking into account the accessibility of the soil and sediment and the actual and reasonably anticipated future uses of the areas."

IMPGs FOR ECOLOGICAL RECEPTORS

IMPG PROPOSAL FOR ECOLOGICAL RECEPTORS

- IMPG Proposal proposed ranges of values for each ecological receptor group for which EPA's ERA found significant risks in the Rest of River area. Those groups, along with the media to which the IMPGs for them would apply, are:
  - Benthic invertebrates (sediments);
  - Frogs (vernal pools);
  - Shrews (floodplain soil);
  - Fish (fish tissue);
  - Mink and otter (dietary items consumed by mink and otter);
  - Osprey (fish tissue);
  - Bald eagles (fish tissue); and
  - Wood ducks (aquatic invertebrates).
- In addition to the numerical values, narrative descriptive goals are also proposed for each receptor group.

NUMERICAL PCB RANGES FOR ECOLOGICAL RECEPTORS

Receptor (media)	Based on ERA Interpretation	Based on Alternate Interpretation
Benthic invertebrates (sediment)	2 ppm to > 100 ppm; EPA MATC = 3 ppm	7 to 18 ppm from EPA's chronic toxicity test data > 42 ppm for coarse sediments and > 16 ppm for fine sediments, based on benthic community field study
Frogs (vernal pools)	3.27 ppm (EPA MATC) to ~ 60 ppm	38.6 to 62 ppm
Shrews (floodplain soil)	21.1 ppm (EPA MATC) to 44 ppm	> 44 ppm
Fish (fish tissue)	Confluence to Wood Pond Dam: 43 to 92 ppm (EPA MATC = 55 ppm) Downstream: Warmwater fish - 45 to 92 ppm; coldwater fish - 14 ppm (EPA MATC) to 43 ppm	Confluence to Woods Pond Dam: 86 to 185 ppm Downstream: Warmwater fish - 144 to 185 ppm; coldwater fish - 86 ppm
Mink/otter (diet)	0.98 ppm (EPA MATC) to 3.7 ppm	> 3.7 ppm
Osprey (fish)	0.31 to 18 ppm (midpoint = 9.4 ppm) for breeding osprey in Rest of River (if any)	6.7 to 75 ppm (midpoint = 41 ppm) for breeding osprey (if any)
Bald eagle (fish)	30.4 ppm (EPA MATC) for resident eagles	37 to 93 ppm for resident eagles.
Wood ducks (aquatic invertebrates)	0.044 to 26 ppm (midpoint = 13 ppm)	6.1 to 68 ppm (midpoint = 37 ppm)

NARRATIVE DESCRIPTIVE GOALS FOR ECOLOGICAL RECEPTORS

- Example for fish:

  "To reduce PCB and dioxin toxicity equivalent (TEQ) concentrations in fish as necessary so that they do not prevent the presence of healthy and sustainable populations of fish in the Rest of River, to the extent that such a population can be supported by available habitat."

NEXT STEPS

CMS PROCESS

- Corrective Measures Study (CMS) Proposal:
  - Following EPA approval of IMPGs and completion of validation of EPA's PCB Fate, Transport, and Bioaccumulation Model, GE must submit CMS Proposal.
  - In CMS Proposal, GE must identify the cleanup alternatives to be studied and describe the methodology to be used in the evaluation.

CMS PROCESS (cont'd)

CMS REPORT – RCRA Permit requires GE to evaluate alternatives according to two tiers of factors:

- General Standards for Corrective Measures (threshold factors that all alternatives must meet)
    1. Overall Protection of Human Health and the Environment, taking into account EPA's risk assessments.
    2. Control of Sources of Releases, including extent to which alternatives could mitigate effects of a flood that could cause contamination to become available for human/eco. exposure.
    3. Compliance with Federal and State ARARs (or, when ARAR would not be met, the basis for a waiver under EPA regulations).
- Selection Decision Factors (balancing factors)
    1. Long-Term Reliability and Effectiveness – Magnitude of residual risk, adequacy and reliability of alternatives, and any potential long-term adverse impacts.
    2. Attainment of IMPGs – Ability of alternatives to achieve IMPGs, including time period for attainment and extent to which it would accelerate attainment compared to natural processes.
    3. Reduction of Toxicity, Mobility, or Volume of Wastes
    4. Short-Term Effectiveness – Impacts to nearby communities, workers, or environment during implementation, including risks associated with excavation, transportation, dewatering, disposal, or containment.
    5. Implementability – Ability to construct and operate the technology, reliability, and availability of on-site or off-site disposal facilities.
    6. Cost

CMS PROCESS (cont'd)

CMS REPORT (cont'd):

- Recommendations of Alternatives:

  -- CMS Report will make recommendation as to which cleanup alternative or combination of alternatives is best suited to meet the "General Standards" in consideration of the "Selection Decision Factors," including a balancing of those factors.

  -- EPA will review CMS Report and propose cleanup standards and actions for Rest of River area as a modification to RCRA Permit.

    - The cleanup standards proposed by EPA may be different from the IMPGs.

    - The proposed cleanup standards and actions will be subject to public comment before being finalized by EPA.

STATUS AND NEXT STEPS

- IMPG Proposal currently under EPA review.
- GE will submit the CMS Proposal 90 days after the approval of the IMPG Proposal and the completion of the peer review of the validation of EPA's PCB Fate, Transport, and Bioaccumulation Model.
- Following approval of the CMS Proposal, GE will submit the CMS Report.